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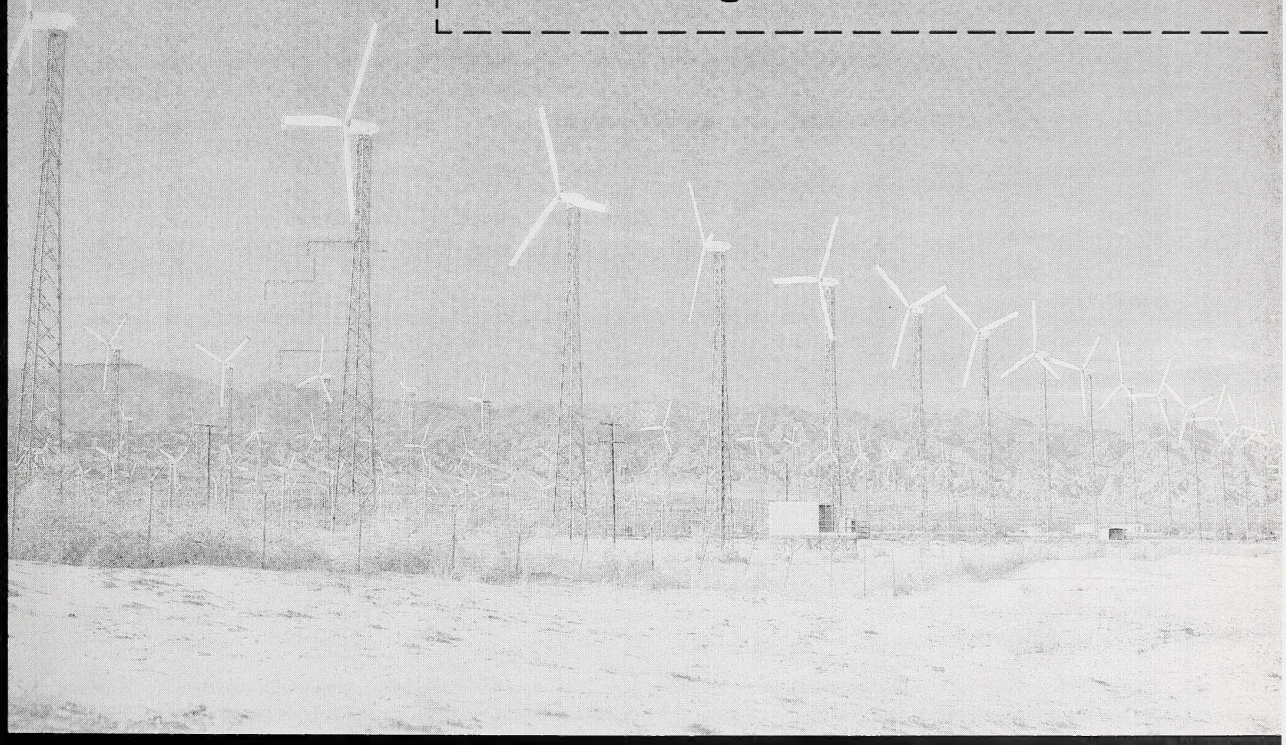
SCIENCE 7

Module 5 Planet Earth

Home Instructor's Guide and Assignment Booklet 5A



Learning Technologies Branch

Alberta LEARNING

Science 7
Module 5: Planet Earth
Home Instructor's Guide and Assignment Booklet 5A
Learning Technologies Branch
ISBN 0-7741-2460-1

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The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Home Instructor's Guide and Assignment Booklet.

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

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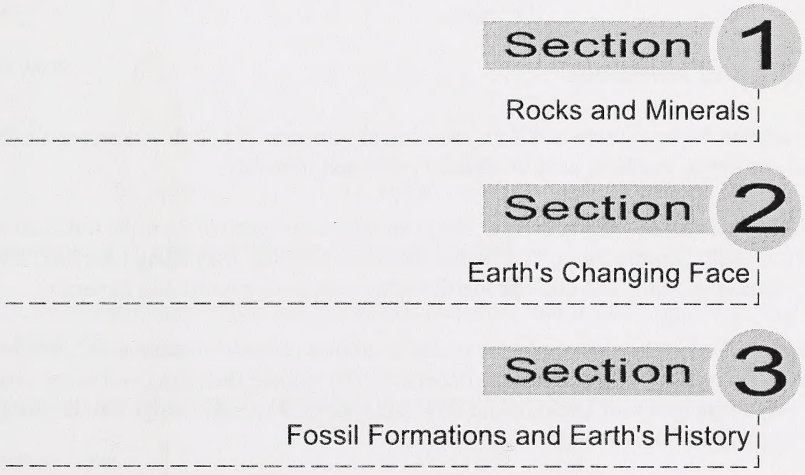
Module 5: Planet Earth

The major emphasis of this module is **Nature of Science**.

The scientific study of Earth is based on direct observation of landforms and materials that make up Earth's surface. It also uses the sample evidence scientists have of Earth's interior. By studying this evidence, the student discovers patterns in the nature and distribution of Earth's materials and patterns in the kinds of changes that take place. This knowledge can be used in developing models for geologic structures and processes. These models help both scientists and students enlarge their understanding of their observations and, thus, guide further investigation and research.



Key Concepts

The following concepts are developed in this module and may also be addressed at other grade levels.

- strata
- rocks and minerals
- rock cycle: formation of igneous rock, metamorphism, and sedimentary processes
- mountain formation: folding and faulting
- crustal movement/plate tectonics
- geological time scale
- fossil formation
- weathering and erosion
- sudden and gradual/incremental change
- development of models based on observation and evidence

Assessment

In this module, students are expected to complete three section assignments and a final module assignment. Their grading in this module is based on the assignments they submit. The mark distribution is as follows:

Assignment Booklet 5A	
Section 1 Assignment	28 marks
Section 2 Assignment	29 marks
Assignment Booklet 5B	
Section 3 Assignment	26 marks
Final Module Assignment	26 marks
TOTAL	109 marks

Section 1: Rocks and Minerals

In this section the student looks at rocks and their constituent minerals. He or she examines theories about the formation of rocks and learns methods used to identify rocks and minerals.

In Lesson 1 the student discusses minerals. He or she examines terms used to describe minerals and how properties of materials help identify them. The student becomes familiar with using hardness, lustre, crystal structure, colour, reaction to acids, and other properties when classifying rocks and minerals.

In Lesson 2 the student studies the rock cycle. He or she examines igneous, metamorphic, and sedimentary rocks, discovering that the way rocks form affects their properties. The student then discovers what affects the size of crystals in rocks, why some rocks are layered, and how one type of rock can change into another. He or she learns how the different families of rocks fit into the rock cycle.

In Lesson 3 the student studies the wearing down of rocks, learning three methods of weathering (mechanical, chemical, and biological). He or she discovers that the results of weathering are all around and is able to identify the agents of weathering. The student also sees that weathering is an important part of the rock cycle.

The following materials will be needed to complete this section.

Section 1: Lesson 1

- mineral samples (optional)
- magnifying glass (or hard lense)
- iron nail
- copper penny (or piece of copper)
- utility knife
- steel file
- streak plate (or file)
- mineral guidebook
- sandpaper
- emery paper
- vinegar (or 10% hydrochloric acid)

Section 1: Lesson 2

- rock samples
- hand lens or binocular microscope

Section 1: Lesson 3

- watch glass
- tongs (or tweezers)
- eyedropper
- vinegar (or 10% hydrochloric acid)
- rock samples

Suggested Answers

Section 1: Lesson 1

9. a. biotite b. quartz c. sulfur d. hematite

10. **Textbook questions 2, 3, and 4 of "Topic 1 Review," p. 360**

    2. Hardness, crystal structure, lustre, colour, streak, cleavage, and fracture are the properties used to identify minerals.

    3. To infer that the sample is quartz, the following observations are necessary:

        - colour: white
        - streak: white
        - hardness: greater than 7 on the Mohs hardness scale

    4. If you can identify the gemstone, you can look up its crystal structure. Remember to get permission before doing any test that might cause damage. You could try checking its hardness and lustre. (Check somewhere that isn't polished.) You could try breaking the sample to see if it has cleavage or fracture. This might show the crystal structure.

Section 1: Lesson 2

3. a. **Textbook questions 1, 4, and 5 of "Analyze," p. 363**

    1. Larger crystals were formed in the jar with the hot water bath. The mixture cooled at a slower rate.

    4. The manipulated variable was the temperature of the water bath (ice water or hot water).

    5. The responding variable was the crystal size.

b. **Textbook questions 6 to 9 of "Conclude and Apply," p. 363**

6. A slow rate of cooling results in larger crystals. A high rate of cooling leads to smaller crystals—there is little time for crystals to grow.

7. Extrusive rocks form from lava cooling quickly on Earth's surface. Therefore, extrusive rocks exhibit no crystal structure or a very fine (small) crystal structure.

8. The crystal size in intrusive rock tends to be larger because it has more time to cool within the crust.

9. Larger gems and larger crystals are generally found deep within the crust because the magma cools slowly.

9.

Rock Family Summary				
Characteristic	**Family**			
	Metamorphic	**Sedimentary**	**Igneous**	
			Intrusive	**Extrusive**
crystals easily visible	✔		✔	
randomly arranged crystals			✔	✔
aligned, flattened, or banded minerals/ crystals (organized, non-random)	✔			
rock particles or grains visible		✔		
no grains or crystals visible				✔
fossils present		✔		
bubbly or glass-like				✔
rock particles/grains stratified into layers of different colour or particle size		✔		

10. Answers will vary greatly depending on the rocks the student examines. The table should indicate that the student has looked closely at each rock and has done his or her best to classify it to family. There is a sample completed in the following chart.

Determining the Type of Rock			
Characteristic	**Sample 1**	**Sample 2**	**Sample 3**
colour(s)	various greys and browns		
crystals visible (size, colour)	none		
rock particles/grains visible (size, colour)	none		
random mineral crystals	none		
aligned, flattened, or banded minerals	none		
grains in layers	yes		
fossils present	none		
other (e.g., smell, response to magnet or acid, cleavage or fracture, density, texture, solubility in water)			
family (**M**etamorphic, **S**edimentary or **I**gneous)	S		

11. a. Characteristics could include the following:

- white mineral arranged in a band
- no crystals or particles visible
- looks very dense
- seems to cleave

The student will likely identify this rock as a metamorphic rock based on his or her level of knowledge and the observable characteristics. It is probably basalt or possibly limestone with veins of a chemically deposited mineral, such as quartz or gypsum.

b. Characteristics could include the following:

- bubbles
- no crystals or particles visible
- does not look very dense
- looks like it is likely to fracture

This rock is igneous extrusive.

c. Characteristics could include the following:

- stratification/layering
- no crystals or particles visible (from this distance)
- looks fairly dense but soft, since it has eroded
- probably made of fairly small rock particles because it is stratified/layered
- has eroded smoothly and particles seem to be deposited at the bottom

This hill of rock is clastic sedimentary rock.

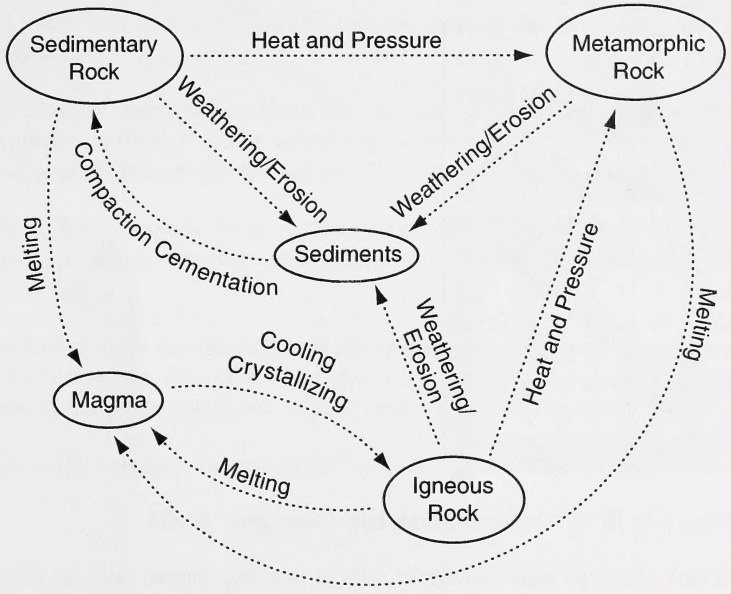
16. **Textbook questions 1 to 6 of "Topic 2 Review," p. 372**

1. Rocks are usually composed of two or more minerals.

2.

Rock Family	Origin	Examples
igneous	cooled magma or lava	granite, basalt, obsidian, diorite, gabbro
sedimentary	inorganic or organic sediments	limestone, sandstone, shale, conglomerate
metamorphic	rock changed by heat and/or pressure	gneiss, marble, quartzite, slate, schist

3. The rock cycle is a process. Rocks change in many ways. Weathering and erosion break rocks down into sediments. Compaction and cementation build sedimentary rock by joining smaller particles. Heat and pressure change rocks into the metamorphic rocks. Melting creates magma and new igneous rock. This is summarized in the following diagram.



4. Leaching moves soluble substances throughout the crust. It facilitates the breaking down of rock into smaller pieces as well as the cementation of material into modified forms.

5. A core sample—a cylindrical column dug out of the crust with a special drill—of sedimentary rock shows the layer deposited last at the top of the column and the layer deposited first at the bottom. Provided this sample was taken from an undisturbed strata (meaning no evidence of faulting or folding exist), you can predict the sequence of deposition from the order in the sample. The sandstone at the bottom of the core sample was deposited first, the shale (in the middle) was deposited next, and the conglomerate (on top) is the most recent deposit. This order of sedimentation could be the result of a changing shoreline. The sandstone could have been deposited during a period when this was a sandy beach. The shale, the result of silt settling out of water, would require a period during which the water level had to be higher. The higher water level and the silt deposits on top of the sand provided the pressure necessary to change the sand deposits into sandstone. A decrease in water level could turn this into a shore, which would lead to the presence of pebbles for the conglomerate.

6. The igneous rock could have been carried and deposited by a glacier or a river.

Section 1 Review

1. **Textbook question 1 of "Reviewing Key Terms," p. 381**

1.

T	N	E	M	I	D	E	S	S	O	R	D
R	S	X	F	K	G	N	I	T	P	L	W
I	B	U	E	O	D	C	A	J	R	I	O
G	R	M	R	D	O	V	Q	O	M	O	H
N	O	I	T	C	A	P	M	O	C	S	F
E	C	N	I	L	W	O	V	R	L	P	B
O	K	E	L	E	M	E	N	T	U	O	G
U	Z	R	E	A	M	E	A	M	S	T	L
S	U	A	E	V	I	S	U	R	T	X	E
W	O	L	L	A	A	H	T	S	R	J	A
F	I	S	D	G	K	L	O	V	E	G	C
F	O	I	T	E	M	P	L	H	A	M	H
G	U	M	A	G	M	A	U	O	K	R	I
V	I	U	S	O	G	D	Z	K	Y	I	N
A	S	D	C	R	Y	S	T	A	L	S	G

2. **Textbook questions 2 to 10 of "Understanding Key Concepts," p. 381**

2. Minerals that have cleavage break in definite directions along smooth surfaces. Minerals that break in irregular directions, like shattered glass, fracture instead of cleave.

3. A hexagonal crystal has six sides.

4. Diamonds are too hard to leave a streak. They scratch the plate instead of leaving mineral fragments.

5. Sediment is the result of crustal material being broken down by chemical and mechanical weathering.

6. Magma is molten rock material found below Earth's surface from which igneous rocks are formed. Lava is magma that reaches Earth's surface from which igneous rocks are formed.

7. Compaction is the process of sediments being pressed together by the weight of other sediments and water above. Cementation is the result of dissolved minerals in water forming a natural cement and sticking larger particles, such as pebbles, together.

8. The diagram describes igneous rock. On the left, magma that cooled and solidified below the surface formed intrusive igneous rock. On the right, molten material reached the surface, became lava, and cooled and solidified to form extrusive igneous rock.

9. Mechanical weathering is the physical breakdown of rock without a new substance being formed. Chemical weathering breaks down rock material by chemical reactions, forming new substances. Biological weathering is the chemical and mechanical breakdown of rock by living organisms.

10. Glaciers scrape and gouge Earth's crust and carry the broken-down rock material and sediments along (similar to a river).

Section 2: Earth's Changing Face

In this section, the student studies Earth's crust, looking at how it got where it is and how it is changing.

In Lesson 1 the student studies the movement of the Earth's crust. He or she looks at different types of evidence of continental drift and learns how new technology helped provide new evidence. The student then develops an understanding of plate tectonics.

In Lesson 2 the student examines earthquakes. He or she sees how earthquakes can be detected and located and discovers where earthquakes are likely to occur and why these locations are where they are. He or she then comes to realize the effects earthquakes have on people and see that there are ways to lessen many of these effects.

In Lesson 3 the student studies volcanoes. He or she becomes familiar with the terminology needed to discuss volcanoes. The student learns where volcanoes are most likely to occur by examining patterns and studies some historical and famous volcanoes.

In Lesson 4 the student learns about mountains. He or she studies how mountains are formed and the different kinds of mountains. The student then discovers where mountains are located and why they are there. He or she also learns to predict the age of mountains based on how eroded they have become.

The following materials will be needed to complete this section.

Section 2: Lesson 1

- scissors
- glue
- world map
- blue paper
- paper
- paints, markers, or coloured pencils
- tape

Section 2: Lesson 2

- compass
- pencil
- map of Canada
- graph paper
- Styrofoam® blocks
- cardboard boxes (or blocks of wood)

Section 2: Lesson 3

- world map with latitude and longitude lines

Section 2: Lesson 4

- flexible Styrofoam® sheets

Suggested Answers

Section 2: Lesson 1

8. a. **Textbook questions 1, 2, and 3 of "Procedure," p. 388**

1. The oldest rock is approximately 102 million years old. The youngest rock is approximately 14 million years old.

2. The distance of the oldest rock from the Mid-Atlantic Ridge is approximately 1550 km. The distance of the youngest rock from the Mid-Atlantic Ridge is approximately 250 km.

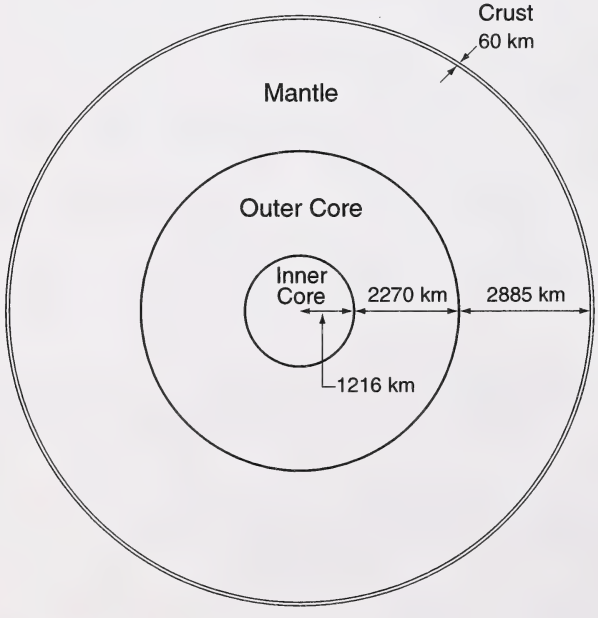
3. Using different colours for the dots, magnetic orientation could be indicated. Using a negative scale (like the number line from mathematics), samples from east and west of the Mid-Atlantic Ridge could be plotted.

b. **Textbook question "What Did You Find Out?," p. 388**

The graph shows that the closer you are to the ridge, the younger the rock. This is evidence that the seafloor is spreading. The linear relationship indicated by the best-fit line suggests a uniform rate of spreading.

14. **Textbook questions 1, 2, 3, 4, and 6 of "Topic 4 Review," p. 394**

1. This should be a diagram similar to the following.



2.

Evidence	Examples
biological	Fossils of similar plants and animals were found on different continents. The continents had to be connected in the past for this to happen.
geological	Rocks of similar composition and age were found on both sides of the Atlantic Ocean. Also, the apparent fit of the continents is evident.
meteorological	Coal, derived from remains of tropical plants, was found in Antarctica, Europe, and North America. These are places that, today, have cold to moderate climates. These continents must have had a similar tropical climate in the past.

3. a. Wegener could not suggest a mechanism that was forceful enough to move the continents. Also, technology of the time was inadequate to prove his theory.

   b. Generally, change is not easily accepted. Scientists in particular are skeptical. This means new ideas must be well-supported before they are accepted.

4. Convection currents in the mantle are now considered to be the power behind plate tectonics.

6. The continental drift theory ignored oceanic plates. It simply had the continents of the world moving. Plate tectonics include the oceanic plates with the continental plates. All of them are moving. This provides a way to explain mountain building, earthquakes, and volcanoes.

Section 2: Lesson 2

6. a. Difference in time will vary slightly. A sample data table is given.

Distance (km)	Difference in Arrival Time
1500	3 min 10 s
2350	4 min
2750	4 min 30 s
3000	4 min 45 s
4000	5 min 40 s
7000	8 min 20 s
9000	9 min 25 s

b. **Textbook questions 1 and 2 of "Analyze," p. 400**

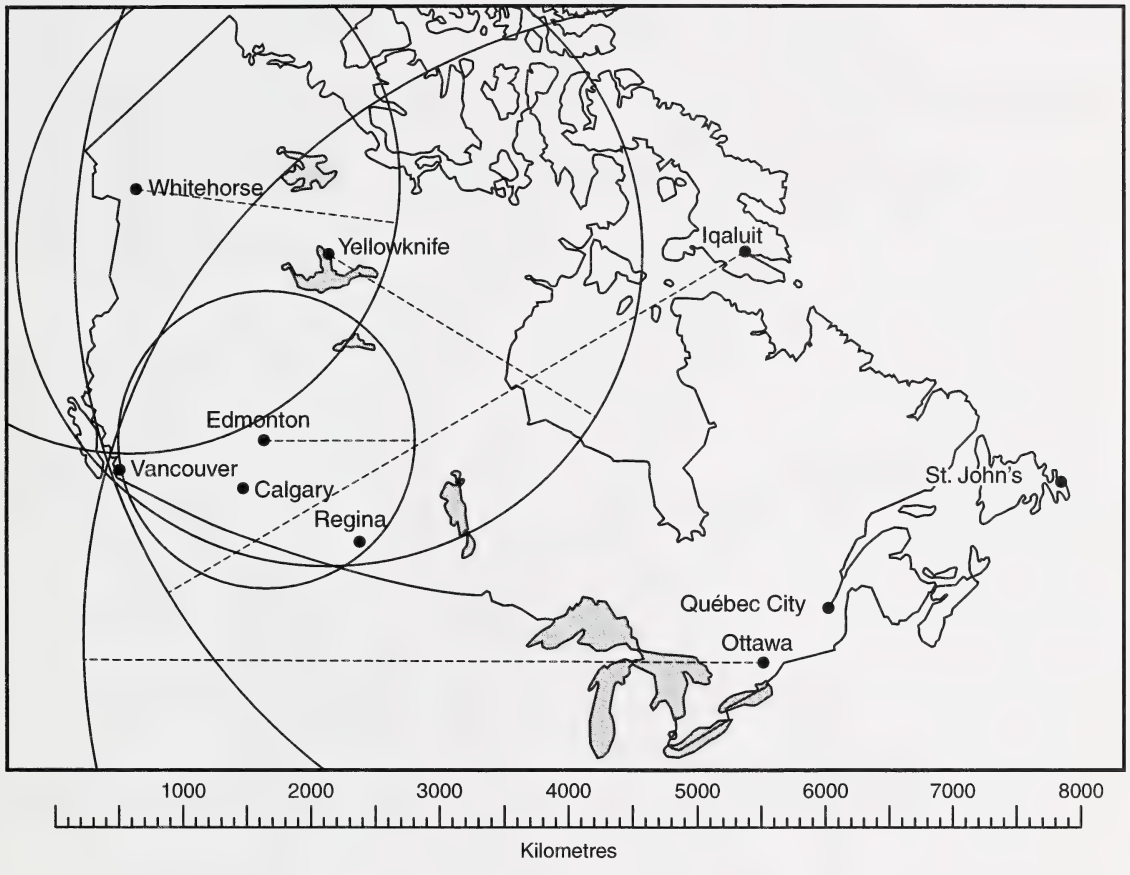
1. The difference in arrival times increases as the distance from the earthquake increases.

2. Your distance from the epicentre of an earthquake can be determined by calculating the difference in arrival times of P waves and S waves.

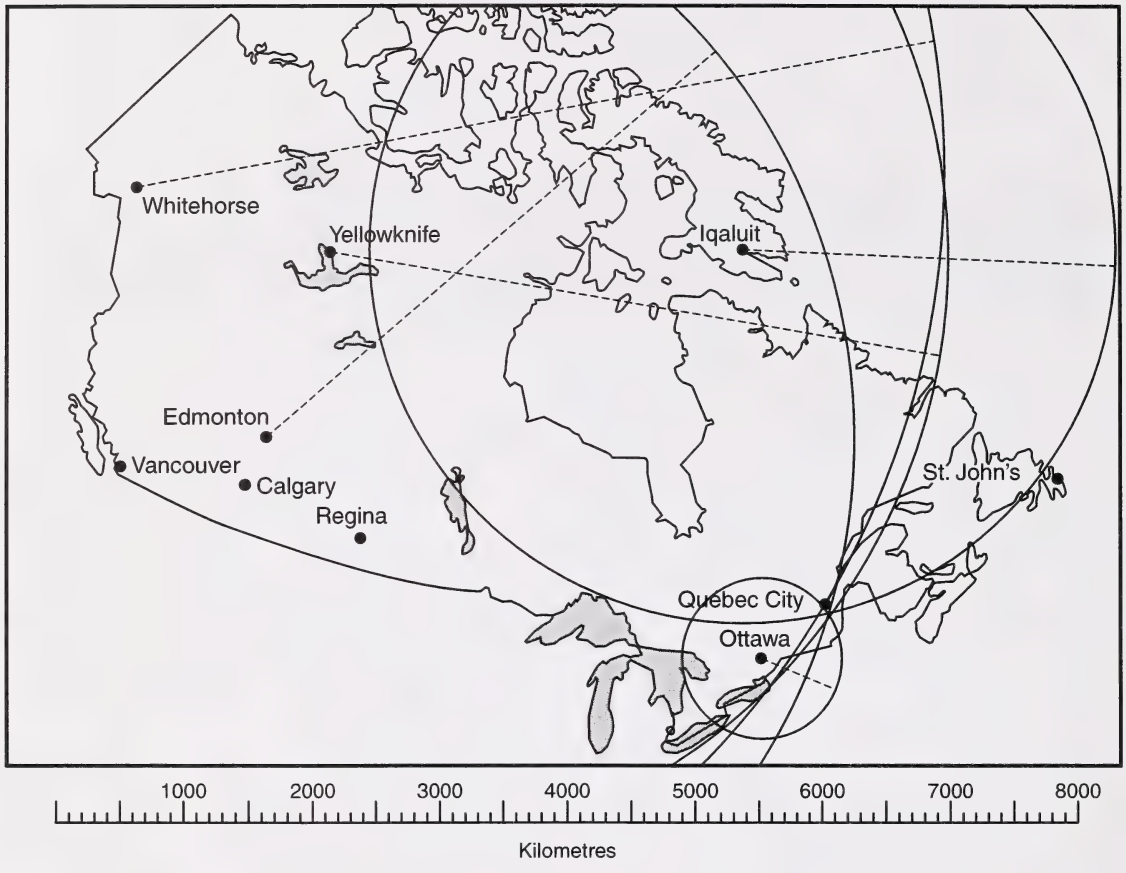
7. a.

Location of Seismograph	Time Difference Between P and S Waves		Distance from Seismograph (km)	
	Earthquake A	Earthquake B	Earthquake A	Earthquake B
Edmonton	**2 min 37 s**	6 min 15 s	**1125**	4500
Iqaluit	6 min 40 s	4 min 40 s	5125	2875
Whitehorse	3 min 50 s	7 min 35 s	2000	6250
Ottawa	6 min 45 s	1 min 35 s	5250	625
Yellowknife	4 min 10 s	6 min 20 s	2375	4750

Location of Earthquake A



Location of Earthquake B



b. **Textbook questions 1, 2, and 3 of "Analyze," p. 401**

1. The epicentre of earthquake A is near Vancouver. The epicentre for earthquake B is near Quebec City.

2. The closer a seismograph is located to the epicentre, the smaller the time difference between the arrival of the P and S waves. The time interval increases as the distance increases.

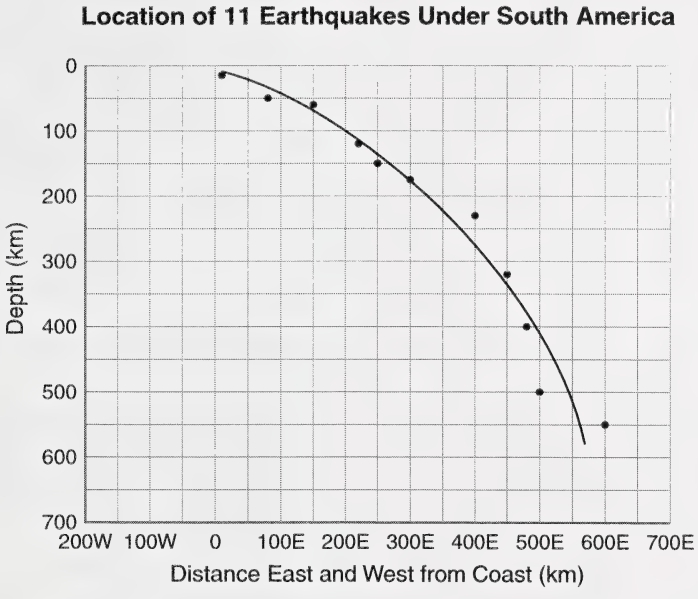
3. A minimum of three seismograph stations are required to accurately locate an epicentre.

c. **Textbook questions 4 and 5 of "Conclude and Apply," p. 401**

4. The intensity of an earthquake cannot be determined using this method.

5. Seismologists could use this technique to determine epicentres. Today, they gather data into databases and use computers to determine the location.

8. a.



b. **Textbook questions 1 to 4 of "Analyze," p. 402**

1. Answers will vary. The triangles should be near the line of best fit.

2. The arrow should run parallel to the plot and point down to the right.

3. Folded mountains, volcanoes, and deep-sea trenches are possible features in this area.

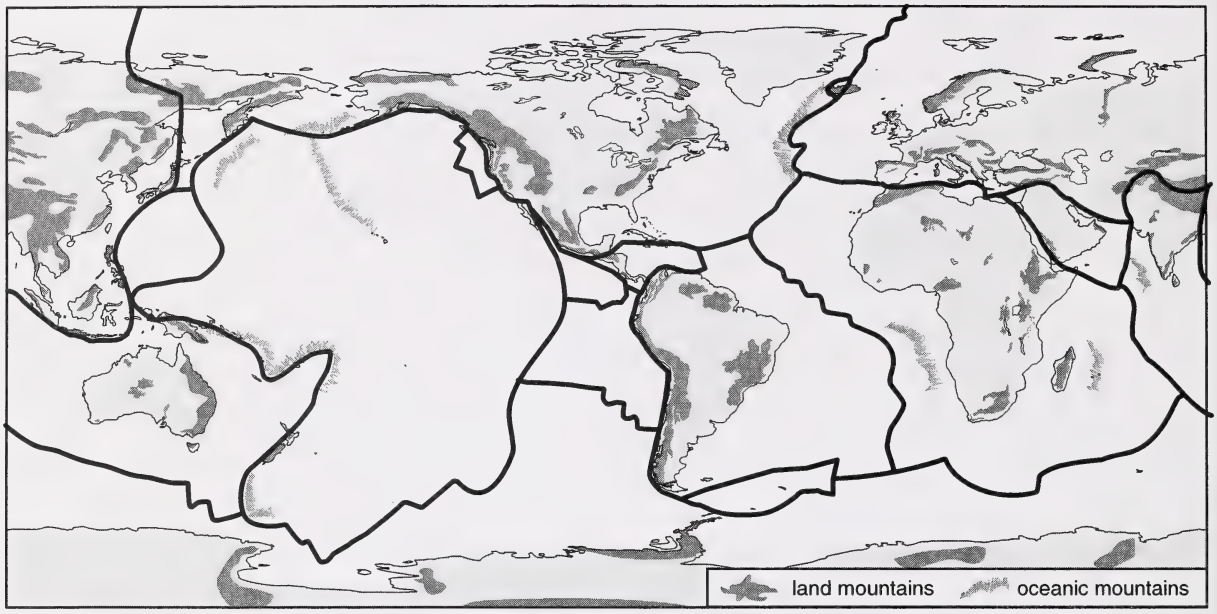
4. This best represents a converging plate boundary, with the oceanic plate subducting under the continental plate.

12. The student will need guidance in selecting materials and the method of building fault models. The outcome should reflect the diagrams on page 403 of the textbook.

13. Responses will vary according to the student's home. Generally, the plan should minimize potential injury from falling objects.

Section 2: Lesson 4

8. a. **Investigation 5-K: Building a Mountain-Building Theory**



b. **Textbook questions 1, 2, and 3 of "Analyze," p. 415**

1. Some suggested categories are folded mountains, faulted mountains, volcanic mountains, and mountains formed at converging or diverging plate boundaries.

2. Most mountains form at or near plate boundaries.

3. Many, but not all, volcanoes occur near mountain ranges.

c. **Textbook questions 4 and 5 of "Conclude and Apply," p. 415**

4. Most, but not all, mountains occur at present plate boundaries. There are numerous exceptions. For example, the mountains along the eastern coast of North America.

5. Mountains may form as a result of plates converging. This results in fault block mountains, folded mountains, and complex mountains. Earth's crust may be uplifted as a result of increased heating in the mantel below. Volcanic activity also results in mountain building.

d. **Textbook questions 6 and 7 of "Extend Your Knowledge," p. 415**

6. The locations should have specific characteristics. It should be on a plate boundary since converging or diverging plates relate to mountain formation. Students may also mention potential for volcanic activity. These new mountains tend to be a bit farther from the boundary of plates.

7. Any good operational definition is acceptable. A *mountain* is any part of a land mass that projects conspicuously above its surroundings.

Section 2 Review

1. **Textbook question 1 of "Reviewing Key Terms," p. 417**

   1. **P wave:** fastest travelling earthquake wave
      epicentre: surface location of an earthquake
      S wave: second type of earthquake wave generated
      syncline: bottom portion of a rock fold
      seismologist: person who studies earthquakes
      Richter scale: scale used to measure earthquake magnitude
      surface wave: wave that causes the most damage
      anticline: upward portion of a rock fold
      focus: rock break location under the ground
      tsunami: huge ocean wave caused by earthquake

2. **Textbook questions 2 to 6 of "Understanding Key Concepts," p. 417**

   2. The layers beneath Earth's crust are the mantle, the outer core, and the inner core. The mantle is the thickest layer and the inner core is the hottest layer.

   3. Seismographs indicate where seismic waves emerge from the surface. Only P waves reach the surface on the opposite side of Earth from the wave source. S waves are absorbed. P waves can travel through solids, liquids, and gases. S waves can only travel through solids; they are absorbed by liquids.

   4. Answers will vary. A sample answer follows.

      The theory of plate tectonics is fairly simple. Earth's crust consists of many large sections. These sections are called plates. These plates are in motion. In some cases, they are running into another plate. In other cases, they are pulling away from another plate. Convection currents in the molten rock below the crust power this motion.

   5. Earthquakes are associated with three kinds of rock movements:

      - **plates pulling apart:** This gives rise to normal faults. These faults generate shallow earthquakes.
      - **plates pushing together:** This gives rise to reverse faults. These faults generate deep earthquakes.
      - **plates sliding along each other:** This gives rise to transform faults. These faults can generate both deep and shallow earthquakes.

   6. The main processes of mountain building are folding and faulting of rock. If rock is pliable, it will fold. If it is brittle, it will fault and the resulting pieces will move along the faults.

ASSIGNMENT BOOKLET 5A

Science 7
Module 5: Section 1 Assignment and Section 2 Assignment

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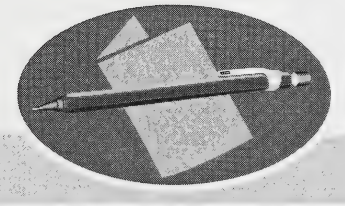
Science 7

Module 5

Planet Earth

Assignment Booklet 5A



Learning Technologies Branch

Alberta LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Section 1 Assignment	28	
Section 2 Assignment	29	
	57	

Teacher's Comments

Science 7
Module 5: Planet Earth
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The Learning Technologies Branch acknowledges with appreciation the Alberta Distance Learning Centre and Pembina Hills Regional Division No. 7 for their review of this Home Instructor's Guide and Assignment Booklet.

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Students	✓
Teachers	✓
Administrators	
Home Instructors	
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- Learning Technologies Branch, **http://www.learning.gov.ab.ca/ltb**
- Learning Resources Centre, **http://www.lrc.learning.gov.ab.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

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ASSIGNMENT BOOKLET 5A
SCIENCE 7: MODULE 5
SECTION 1 ASSIGNMENT AND SECTION 2 ASSIGNMENT

Your mark for this module will be determined in part by how well you do your assignments.

This Assignment Booklet is worth 57 marks out of the total 109 marks for the assignments in Module 5. The value of each assignment and each question is stated in the left margin.

Work slowly and carefully. If you have difficulty, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

Section 1 Assignment: Rocks and Minerals

28

Read all parts of your assignment carefully and record your answers in the appropriate places.

1. You are provided with a sample of each of the following minerals: bornite, diamond, galena, tourmaline, and uraninite.

(5) a. Using the following information, place the minerals in order of softest to hardest.

- Tourmaline cannot be scratched by a copper coin or a penknife (steel).
- Bornite scratches galena.
- Uraninite can be scratched by a steel penknife, but not by a copper coin.
- Bornite can be scratched by a copper coin, but not by a fingernail.
- Diamond scratches all the other minerals.

_____

_____

(1) b. Use the Mohs hardness scale to assign an approximate hardness number to bornite.

_____

Return to page 23 of the Student Module Booklet and begin Lesson 2.

(4) 2. Complete the following table.

Parent Rock	Metamorphic Rock
limestone	
	slate
granite	
	schist

Return to page 32 of the Student Module Booklet and continue with Lesson 2.

For questions 3 and 4, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

(1) _____ 3. A fossil is found in a rock. Which type of rock is most likely being discussed?

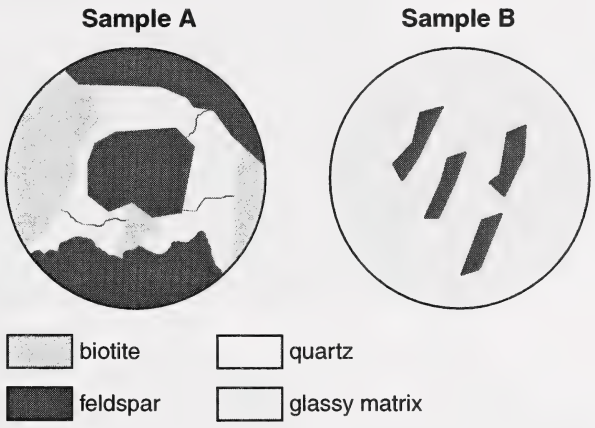
A. diamond
B. halite
C. quartz
D. shale

(1) _____ 4. Minerals from topsoil move to lower soil layers. This process is known as

A. acid rain
B. compacting
C. composting
D. leaching

Return to page 39 of the Student Module Booklet and begin Lesson 3.

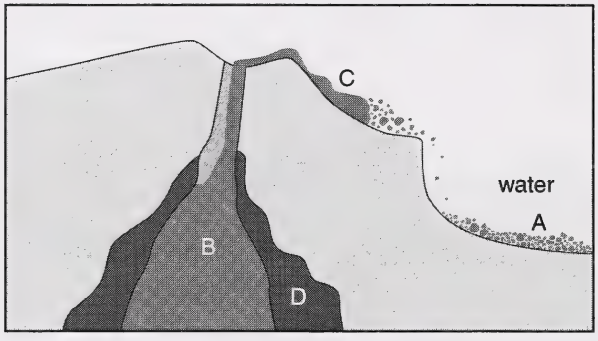
5. You have been provided with thin sections of two rock samples, A and B. They are to be examined under a microscope. You are told both samples are igneous rock: one from a lava flow, the other cooled underground.



(3) a. Which sample is from the lava flow and which was cooled underground? Explain your answer.

(3) b. Both samples have the same mineral content, yet one has three visible minerals and the other only one. Explain this.

6. Study the following diagram. Match the letters on the diagram with the appropriate description. Some letters may be used more than once.



(1) _____ a. Extrusive igneous rock will form here.

(1) _____ b. Rock with large crystals will form here.

(1) _____ c. Metamorphic rock could form here.

(1) _____ d. Rocks showing layers will form here.

(1) _____ e. magma

(5) 7. The concrete sidewalk in front of a house is badly cracked. It is uneven and its surface is pitted, exposing small rocks. In the front yard are two very large spruce trees.

The breakdown of the sidewalk is a result of mechanical and chemical weathering. It involves both biological and non-biological agents. Explain these two statements.

Return to page 45 of the Student Module Booklet and begin Section 2.

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Section 2 Assignment: Earth's Changing Face

Read all parts of your assignment carefully and record your answers in the appropriate places.

Read question 1 carefully. Decide which of the choices BEST answers the question. Place your answer in the blank space given.

(1) _____ 1. Most scientists now accept the theory of plate tectonics. This was not true 75 or 80 years ago. Scientists couldn't figure out what could move the plates. Which of the following is believed to cause the plates to move?

A. continental drift
B. convection currents
C. diverging plates
D. subduction zones

2. Here is a set of reverse questions. For each answer given, write an appropriate question.

(1) a. Alfred Wegener is the answer to this question.

_____

_____

_____

(1) b. J. Tuzo Wilson is the answer to this question.

_____

_____

_____

(1) c. Plate tectonics is the answer to this question.

_____

_____

_____

(4)

3. The terms *rift valley* and *mid-ocean ridge* describe two geologic features found in Earth's crust. Compare and contrast these two features.

Return to page 54 of the Student Module Booklet and begin Lesson 2.

(1)

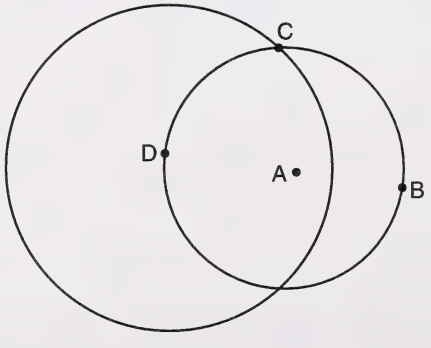
For questions 4 and 5, read each question carefully. Decide which of the choices BEST answers the question. Place your answer in the blank space given.

_____ 4. Earthquakes can cause a sudden drastic change in the Earth's crust. Which of the following instruments lets scientists find the epicentre of an earthquake?

A. deep sea drilling
B. satellite imaging
C. seismograph
D. sonar

(1)

_____ 5. You have found the epicentre of an earthquake. Part of the work needed is shown in the following diagram. One of the marked locations is close to the epicentre. Which location is the epicentre of the earthquake?



(2)

6. The first earthquake on record in Canada occurred in about 1535, near Québec City. Does that mean no earthquakes occurred in Canada before that date? Explain.

Return to page 67 of the Student Module Booklet and begin Lesson 3.

(5)

7. The Theory of Plate Tectonics was accepted because it explained so many geological events. It can be used to explain where most volcanoes are found. Where does most of Earth's volcanic activity take place? Use the Theory of Plate Tectonics to explain why it takes place there.

Read question 8 carefully. Decide which of the choices BEST answers the question. Place your answer in the blank space given.

(1)

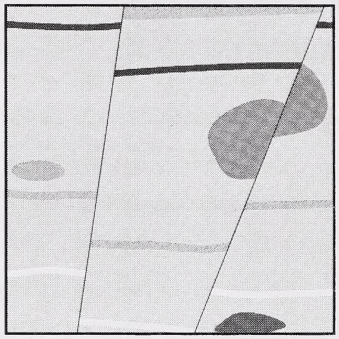
_____ 8. A volcano is erupting. Many words will be used to describe this eruption. One of the following words will not be used. Which one is it?

A. ash
B. dormant
C. lava
D. steam

Return to page 72 of the Student Module Booklet and begin Lesson 4.

(2)

9. The diagram given shows part of a faulted rock face. Were compression forces or tension forces the most likely the cause of this faulting? Which type of fault is illustrated?



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10. The Nazca plate off the west coast of South America can move 130 mm a year.

(2)

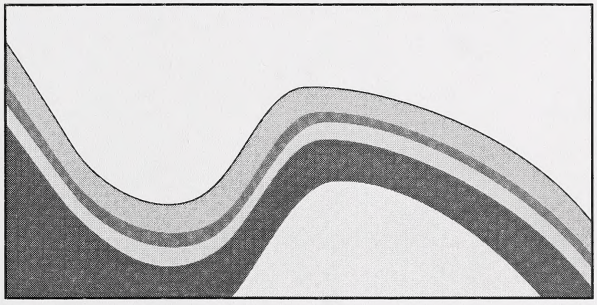
a. Calculate how far it would move at this rate in one million years.

(1) b. Study Figure 5.43 on page 390 of the textbook. Suggest how this move will affect the size of this plate.

_____

_____

(2) 11. The following diagram illustrates changes occurring due to a collision of tectonic plates. On the diagram, label the syncline and anticline.



(4) 12. Suppose the diagram in question 11 represents the collision of two continental plates. Predict the outcome of this collision process continuing for one million years. Is volcanic activity a high probability in this region? Explain.

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Submit your completed Assignment Booklet 5A to your teacher for assessment.
Then return to page 77 of the Student Module Booklet and begin Section 3.

ASSIGNMENT BOOKLET DECLARATIONS

The Student's Declaration is to be signed by a student registered at the Alberta Distance Learning Centre. If the student is under 16, the Supervisor's Declaration is to be signed by the student's supervisor, who is usually a home instructor, teacher, or home-schooling coordinator. Failure to complete this page may invalidate the assignment results.

STUDENT'S DECLARATION

- I have followed the instructions outlined in the Student Module Booklet.
- I have completed the activities to prepare myself for the assignments in this Assignment Booklet.
- I completed the assignments in this Assignment Booklet by myself.

_____

Student's Signature

SUPERVISOR'S DECLARATION

I hereby certify that I have supervised the learning activities completed by _____.

Student's Name

I also certify that to the best of my knowledge the assignments in this Assignment Booklet were completed independently by this student.

_____

Supervisor's Signature

If you, the student or supervisor, have any comments or observations regarding this module, write them in the following space.

_____

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